

POSTER PRESENTATION

Open Access

Predictive accuracy of semi-quantitative scoring to screen for unfavorable ejection fraction and infarct size

Lara Bakhos*, Maria M Izquierdo-Gomez, Daniel C Lee, Edwin Wu

From 2011 SCMR/Euro CMR Joint Scientific Sessions
Nice, France. 3-6 February 2011

Background

Manual planimetry for quantitative analysis of ejection fraction (EF) and infarct size (IS) on cardiac magnetic resonance (CMR) imaging are too time-consuming, and therefore, impractical in daily clinical practice. We sought to derive and examine the predictive accuracy of a semi-quantitative scoring technique to screen patients with an EF $\leq 35\%$ or an IS $\geq 18.5\%$, known independent predictors of increased cardiac events and mortality.

Methods

The CMR derivation cohort consisted of 122 ST-segment elevation myocardial infarction patients. The validation cohort consisted of an additional 172 patients from the multi-center Defibrillators To Reduce Risk by MagnetIc ResoNance Imaging Evaluation (DETERMINE) trial. Cines were scored on a 17-segment model for wall motion and totaled for the Sum Motion Score (SMS): 0 = normal, 1 = mild hypokinesis, 2 = moderate to severe hypokinesis, 3 = akinesis, 4 = dyskinesis. Viability images were scored for infarct transmural extent and totaled for the Sum Infarct Score (SIS): 0 = none, 1 = 1-25%, 2 = 26-50%, 3 = 51-75%, 4 = 76-100%. Quantitative EF and IS were manually planimetryed using QMass (Medis).

Results

From the derivation cohort, the SMS correlated with EF ($R = -0.91$, $p < 0.001$) and SIS correlated with IS ($R = 0.94$, $p < 0.001$). Linear regression equations between SMS vs. EF and SIS vs. IS were obtained to estimate EF (est-EF = $55 - \text{SMS}$) and IS (est-IS = $1.383 * \text{SIS}$).

In the validation cohort, the mean EF was $39.0 \pm 11.7\%$ (32% with EF $\leq 35\%$), and the mean IS was $17.3 \pm 10.4\%$ (40% with IS $\leq 18.5\%$). Using the derivation formula, the est-EF ($36.2 \pm 10.9\%$) correlated with EF ($R = 0.9$) with a slight underestimation of the mean difference by $2.8 \pm 4.9\%$. In addition, the est-IS ($21.8 \pm 12.8\%$) correlated with IS ($R = 0.9$). The est-IS tended to overestimate IS by $4.5 \pm 5.9\%$. The sensitivity for detecting an EF $\leq 35\%$ using the est-EF was 94% with a negative predictive value of 97%. The sensitivity for detecting an IS $\geq 18.5\%$ using the est-IS was 96% with a negative predictive value of 96%.

Conclusions

Semi-quantitative scoring is a sensitive screening tool that can be used to identify patients with an ejection fraction $\leq 35\%$ or infarct size $\geq 18.5\%$ to provide a rapid alternative method to manual planimetry.

Published: 2 February 2011

doi:10.1186/1532-429X-13-S1-P44

Cite this article as: Bakhos et al.: Predictive accuracy of semi-quantitative scoring to screen for unfavorable ejection fraction and infarct size. *Journal of Cardiovascular Magnetic Resonance* 2011 **13**(Suppl 1):P44.